

CLAIMS

What is claimed is:

1. A rail assembly for a ladder comprising:
an inner rail assembly comprising a first inner rail, a second inner rail spaced apart from the first rail a first distance and substantially parallel to the first inner rail, and at least one inner rung extending between and coupled to the first and second inner rails;
a first discrete sleeve adjacent the first inner rail and slidable along at least a portion of a length of the first rail;
a second discrete sleeve adjacent the second inner rail and slidable along at least a portion of a length of the second rail;
a first outer rail having a first end fixedly coupled to the first sleeve;
a second outer rail having a first end fixedly coupled to the second sleeve; and
at least one outer rung extending between and coupled to the first and second outer rails, wherein a second distance extending between a second end of the first outer rail and a second end of the second outer rail is greater than the first distance.
2. The rail assembly of claim 1, wherein the first outer rail comprises at least one substantially straight rail section and wherein the second outer rail comprises at least another substantially straight rail section.
3. The rail assembly of claim 2, wherein the at least one substantially straight rail section of the first outer rail is oriented at an acute angle relative to the first inner rail and wherein the at least one substantially straight rail section of the second outer rail is oriented at an acute angle relative to the second inner rail.
4. The rail assembly of claim 1, wherein the first and second sleeves are identical.
5. The rail assembly of claim 1, further comprising a support member extending between and coupled to the first and second sleeves.

6. The rail assembly of claim 1, wherein the at least one inner rung includes a plurality of rungs.

7. The rail assembly of claim 6, wherein each of the first and second sleeves are each affixed to at least one inner ladder rung of the plurality of inner ladder rungs.

8. The rail assembly of claim 1, wherein the at least one outer rung includes a plurality of outer rungs.

9. The rail assembly of claim 1, wherein at least a portion of the first sleeve is disposed within a channel defined by the first outer rail and wherein at least a portion of the second sleeve is disposed within a channel defined by the second outer rail.

10. The rail assembly of claim 1, further comprising a first engagement structure for selectively locking the first sleeve in a position relative to the first inner rail, and a second engagement structure for selectively locking the second sleeve in a position relative to the second inner rail

11. A reinforcement structure for a ladder system comprising:
a rail having a first longitudinally extending wall and a second opposing longitudinally extending wall spaced apart from the first longitudinally extending wall;
a rung having a first end attached to the first longitudinally extending wall; and
at least one support structure coupled to the rung at a location laterally spaced from the first end of the rung and wherein the at least one support structure is coupled to the rail in at least two mutually remotely spaced locations thereof.

12. The reinforcement structure of claim 11, wherein at least one location of the at least two mutually remotely spaced locations is on the first longitudinally extending wall and wherein at

least one other location of the at least two mutually remotely spaced locations is on the second opposing longitudinally extending wall.

13. The reinforcement structure of claim 11, wherein the at least two mutually remotely spaced locations are longitudinally spaced apart along the rail.

14. The reinforcement structure of claim 11, wherein the at least one support structure is a unitary member.

15. The reinforcement structure of claim 11, wherein the at least one support structure includes two support structures, each of the two support structures being coupled to the rung at the location laterally spaced from the first end.

16. The reinforcement structure of claim 11, wherein the rail exhibits a substantially C-shaped cross-sectional geometry taken transverse to the first longitudinally extending wall.

17. The reinforcement structure of claim 16, wherein the at least one support structure is substantially disposed within a channel defined substantially C-shaped cross-sectional geometry.

18. A ladder hinge and rail assembly comprising:
a first ladder rail;
a second ladder rail;
a first hinge component having a laterally extending hinge-tongue and a longitudinally extending rail mount section, the longitudinally extending rail mount section of the first hinge component exhibiting a varying cross-sectional geometry taken transverse to a longitudinal axis thereof, wherein the longitudinally extending rail mount section of the first hinge component is partially longitudinally disposed within the first ladder rail in a substantially conformal and cooperatively mating relationship;
a second hinge component having a lateral hinge-groove and a longitudinally extending rail mount section, the longitudinally extending rail mount section of the second hinge component

exhibiting a varying cross-sectional geometry taken transverse to a longitudinal axis thereof, wherein the longitudinally extending rail mount section of the second hinge component is partially longitudinally disposed within the second ladder rail in a substantially conformal and cooperatively mating relationship, and wherein the hinge-tongue of the first hinge component is disposed within the hinge-groove of the second hinge component and configured to provide relative rotation of the first and second hinge components about a defined axis.

19. The ladder hinge and rail assembly of claim 18, wherein an internal cross-sectional periphery of the first rail is configured to interlock with and transmit an applied loading to the rail mount section of the first hinge component.

20. The ladder hinge and rail assembly of claim 19, wherein an internal cross-sectional periphery of the second rail is configured to interlock with and transmit an applied loading to the rail mount section of the second hinge component.

21. The ladder hinge and rail assembly of claim 18, wherein the rail mount section of the first hinge component includes a first reinforcement segment, a second reinforcement segment and a web section extending therebetween, wherein the first and second reinforcement segments each exhibit a greater cross-sectional thickness than a cross-sectional thickness of the web segment.

22. The ladder hinge and rail assembly of claim 18, wherein the first hinge component is configured as a unitary member.

23. The ladder hinge and rail assembly of claim 22, wherein the second hinge component is configured as a unitary member.

23. The ladder hinge and rail assembly of claim 48, wherein the first hinge component comprises an extruded member.

24. The ladder hinge and rail assembly of claim 23 wherein the second hinge component comprises an extruded member.

25. A ladder comprising:
a first hinge component coupled to a first rail;
a second hinge component coupled to a second rail, the second hinge component being rotatably coupled with the first hinge component between a first position and a second position;
at least one protruding member biased outwardly from the first hinge component when the first hinge component and the second hinge component are in the first position and wherein the at least one protruding member is located and configured to be displaced relative to the first hinge component when the first hinge component and the second hinge component are in the second position.

26. The ladder of claim 25, wherein the at least one protruding member is configured to be displaced into an interior portion of the first hinge component when the first hinge component and the second hinge component are in the second position.

27. The ladder of claim 25, wherein the at least one protruding member is located and configured to be displaced by the second hinge component when the first hinge component and the second hinge component are in the second position.